

WHAT IS CLAIMED IS:

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1. A process for preparing a fiber-reinforced thermoplastic composite article comprising the steps of:
  - a) drawing a fiber bundle continuously through a melt obtained by heating a rigid thermoplastic resin;
  - b) impregnating the drawn fiber bundle with the melted rigid thermoplastic resin to form a composite melt;
  - c) drawing the composite melt through a consolidation die to form a thermoformable shaped article;
  - d) thermoforming the shaped article on-line; and
  - e) cooling the shaped article to solidify the thermoplastic resin.
2. The process of claim 1, wherein said thermoplastic resin includes a depolymerizable and repolymerizable thermoplastic resin having a  $T_g$  of not less than 50°C.
3. The process of claim 2, wherein said thermoforming is performed by passing said shaped article through a rotary die, at a temperature sufficiently high that the thermoplastic resin is at least softened enough that the composite can be shaped under the pressure imposed by the rotary die, and then cooling the shaped article to a temperature below the solidification temperature of the thermoplastic resin.
4. The process of claim 2, wherein said thermoforming is performed by passing the shaped article through a pair of moving caterpillar rollers that are oriented perpendicular to the direction of the pultrusion while maintaining the shaped article at an elevated temperature such that it remains thermoformable so that the shaped article is twisted by movement of said caterpillar rollers, and then cooling the shaped article to a temperature below the solidification temperature of the thermoplastic resin.

5. The process of claim 2, wherein said thermoforming is performed by passing said shaped article through a rotating die while maintaining the shaped article at an elevated temperature such that it remains thermoformable, and then cooling the shaped article to a temperature below the solidification temperature of the thermoplastic resin.

6. The process of claim 2, wherein said thermoforming is performed by hauling off one side of said shaped article at a faster rate than another side while maintaining the shaped article at an elevated temperature such that it remains thermoformable, and then cooling the shaped article to a temperature below the solidification temperature of the thermoplastic resin.

7. The process of claim 6, wherein said shaped article is passed through a curved cooling die that is equipped with an internal means which forces some of the reinforcing fibers to travel a longer path through the die than others, and wherein the thermoplastic is solidified in said cooling die, thereby forming a curved composite.

8. The process of claim 2, wherein said thermoforming is performed by winding said shaped article on a mandrel, and then cooling said shaped article to a temperature below the solidification temperature of the thermoplastic resin.

9. The process of claim 2, wherein said depolymerizable and repolymerizable thermoplastic is a thermoplastic polyurethane or polyurea.

10. The process of claim 8, wherein said reinforcing fibers are glass, other ceramic, carbon, metal or polymeric fibers.

11. The process of claim 2, wherein said thermoplastic resin is a blend of a depolymerizable and repolymerizable polyurethane or polyurea and a polystyrene, polyvinyl chloride, ethylene vinyl acetate, ethylene vinyl alcohol, polybutylene terephthalate, polyethylene

terephthalate, acrylonitrile-styrene-acrylic, ABS (acrylonitrile-butadiene-styrene),  
polycarbonate, aramid or polypropylene resin.